TORQ Analysis of Electrical Engineering Technicians to Mechanical Drafters

INPUT SECTION:

Transfer	Title	O*NET	Filters		
From Title:	Electrical Engineering Technicians	17-3023.03	Abilities:	Importance LeveL: 50	Weight: 1
To Title:	Mechanical Drafters	17-3013.00	Skills:	Importance LeveL: 69	Weight: 1
Labor Market Area:	Maine Statewide		Knowledge:	Importance Level: 69	Weight: 1

OUTPUT SECTION:

Grand TORQ:	86

Ability TORQ		Skills TORQ		Knowledge TORQ	
Level	88	Level	83	Level	86

Gaps To Narrow if Possible

Ability	Level	Gap	Impt
Mathematical Reasoning	64	27	75
Number Facility	55	29	59
Fluency of Ideas	59	24	65
Far Vision	50	29	53
Originality	59	22	62
Visualization	69	16	84
Problem Sensitivity	62	14	78
Near Vision	69	12	84
Speed of Closure	44	19	53
Flexibility of Closure	50	16	59
Category Flexibility	59	15	59
Speech Recognition	50	9	68
Inductive Reasoning	59	8	75
Perceptual Speed	46	11	53
Written Expression	66	6	78
Deductive Reasoning	64	5	75
Oral Expression	66	4	84

Upgrade These Skills

Skill	Level	Gap	Impt
Technology Design	67	13	74
Equipment Selection	72	10	71
Active Listening	66	6	77
Instructing	62	6	75
Reading Comprehension	69	3	82
Complex Problem Solving	65	2	71

Knowledge to Add

Knowledge	Level	Gap	Impt
Design	89	22	95
Mathematics	70	7	75
Engineering and Technology	80	3	84

Oral Comprehension	66	4	81
Written Comprehension	64	4	75
Speech Clarity	44	2	72

LEVEL and IMPT (IMPORTANCE) refer to the Target Mechanical Drafters. GAP refers to level difference between Electrical Engineering Technicians and Mechanical Drafters.

ASK ANALYSIS

Ability Level Comparison - Abilities with importance scores over 50

Description	Electrical Engineering Technicians	Mechanical Drafters	Importance
Oral Expression	62	66	84
Visualization	53	69	84
Near Vision	57	69	84
Oral Comprehension	62	66	81
Written Expression	60	66	78
Problem Sensitivity	48	62	78
Written Comprehension	60	64	75
Deductive Reasoning	59	64	75
Inductive Reasoning	51	59	75
Information Ordering	57	57	75
Mathematical Reasoning	37	64	75
Speech Clarity	42	44	72
Speech Recognition	41	50	68
Fluency of Ideas	35	59	65
Originality	37	59	62
Category Flexibility	44	59	59
Number Facility	26	55	59
Flexibility of Closure	34	50	59
Selective Attention	42	42	59
Arm-Hand Steadiness	46	46	56
Finger Dexterity	42	42	56
Speed of Closure	25	44	53

Perceptual Speed	35	46	53
Far Vision	21	50	53

Skill Level Comparison - Abilities with importance scores over 69

Description	Electrical Engineering Technicians	Mechanical Drafters	Importance
Reading Comprehension	66	69	82
Mathematics	71	70	79
Active Listening	60	66	77
Instructing	56	62	75
Critical Thinking	67	60	74
Technology Design	54	67	74
Complex Problem Solving	63	65	71
Equipment Selection	62	72	71

Knowledge Level Comparison - Knowledge with importance scores over 69

Description	Electrical Engineering Technicians	Mechanical Drafters	Importance
Design	67	89	95
Engineering and Technology	77	80	84
Mathematics	63	70	75

Experience & Education Comparison

Related Work Experience Comparison

Description	Electrical Engineering Technicians	Mechanical Drafters
10+ years	0%	0%
8-10 years	2%	2%
6-8 years	19%	0%
4-6 years	14%	7%
2-4 years	28%	26%
1-2 years	23%	0%
6-12 months	0%	30%
3-6 months	0%	25%
1-3 months	0%	0%
0-1 month	0%	0%
None	12%	5%

Required Education Level Comparison

Description	Electrical Engineering Technicians	Mechanical Drafters
Doctoral	0%	0%
Professional Degree	0%	0%
Post-Masters Cert	2%	0%
Master's Degree	0%	0%
Post-Bachelor Cert	0%	0%
Bachelors	21%	0%
AA or Equiv	24%	81%
Some College	32%	5%
Post-Secondary Certificate	19%	13%
High Scool Diploma or GED	0%	0%
No HSD or GED	0%	0%

Electrical Engineering Technicians	Mechanical Drafters
Most Common Educational/Training Requirement:	
Associate degree	Postsecondary vocational award
Job Zone Comparison	
3 - Job Zone Three: Medium Preparation Needed	3 - Job Zone Three: Medium Preparation Needed
Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.	Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.
Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Some may require a bachelor's degree.	Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Some may require a bachelor's degree.
Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers.	Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers.

Tasks

Electrical Engineering Technicians

Core Tasks

Generalized Work Activities:

- Inspecting Equipment, Structures, or Material - Inspecting equipment, structures, or materials to identify the cause of errors or other problems or defects.
- Identifying Objects, Actions, and Events - Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.
- Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.
- Updating and Using Relevant Knowledge - Keeping up-to-date technically and applying new knowledge to your job.
- Processing Information - Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.

Specific Tasks

Occupation Specific Tasks:

- Analyze and interpret test information to resolve design-related problems.
- Assemble electrical and electronic systems and prototypes according to engineering data and knowledge of electrical principles, using hand tools and measuring instruments.
- Build, calibrate, maintain, troubleshoot and repair electrical instruments or testing equipment.
- Collaborate with electrical engineers and other personnel to identify, define, and solve developmental problems.

Mechanical Drafters

Core Tasks

Generalized Work Activities:

- Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment - Providing documentation, detailed instructions, drawings, or specifications to tell others about how devices, parts, equipment, or structures are to be fabricated, constructed, assembled, modified, maintained, or used.
- Interacting With Computers - Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.
- Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources.
- Making Decisions and Solving Problems - Analyzing information and evaluating results to choose the best solution and solve problems.
- Processing Information - Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.

Specific Tasks

Occupation Specific Tasks:

- Check dimensions of materials to be used and assign numbers to the materials.
- Compute mathematical formulas to develop and design detailed specifications for components or machinery using computer-assisted equipment.
- Confer with customer representatives to review schematics and answer questions pertaining to installation of systems.
- Coordinate with and consult other

- Conduct inspections for quality control and assurance programs, reporting findings and recommendations.
- Draw or modify diagrams and write engineering specifications to clarify design details and functional criteria of experimental electronics units.
- Evaluate engineering proposals, shop drawings and design comments for sound electrical engineering practice and conformance with established safety and design criteria, and recommend approval or disapproval.
- Install and maintain electrical control systems and solid state equipment.
- Modify electrical prototypes, parts, assemblies, and systems to correct functional deviations.
- Perform supervisory duties such as recommending work assignments, approving leaves and completing performance evaluations.
- Plan method and sequence of operations for developing and testing experimental electronic and electrical equipment.
- Plan, schedule and monitor work of support personnel to assist supervisor.
- Prepare contracts and initiate, review and coordinate modifications to contract specifications and plans throughout the construction process.
- Prepare project cost and work-time estimates.
- Provide technical assistance and resolution when electrical or engineering problems are encountered before, during, and after construction.
- Review existing electrical engineering criteria to identify necessary revisions, deletions or amendments to outdated material.
- Set up and operate test equipment to evaluate performance of developmental parts, assemblies, or systems under simulated operating conditions, and record results.
- Visit construction sites to observe conditions impacting design and to identify solutions to technical design problems involving electrical systems equipment that arise during construction.
- Write commissioning procedures for electrical installations.

Detailed Tasks

Detailed Work Activities:

- analyze engineering test data
- analyze technical data, designs, or preliminary specifications
- analyze test data
- calculate engineering specifications
- calibrate or adjust electronic equipment or

workers to design, lay out, or detail components and systems and to resolve design or other problems.

- Design scale or full-size blueprints of specialty items such as furniture and automobile body or chassis components.
- Develop detailed design drawings and specifications for mechanical equipment, dies, tools, and controls, using computer-assisted drafting (CAD) equipment.
- Draw freehand sketches of designs, trace finished drawings onto designated paper for the reproduction of blueprints, and reproduce working drawings on copy machines.
- Lay out and draw schematic, orthographic, or angle views to depict functional relationships of components, assemblies, systems, and machines.
- Lay out, draw, and reproduce illustrations for reference manuals and technical publications to describe operation and maintenance of mechanical systems.
- Modify and revise designs to correct operating deficiencies or to reduce production problems.
- Position instructions and comments onto drawings.
- Review and analyze specifications, sketches, drawings, ideas, and related data to assess factors affecting component designs and the procedures and instructions to be followed.
- Shade or color drawings to clarify and emphasize details and dimensions or eliminate background using ink, crayon, airbrush, and overlays.
- Supervise and train other drafters, technologists, and technicians.

Detailed Tasks

Detailed Work Activities:

- analyze technical data, designs, or preliminary specifications
- analyze test data
- collect scientific or technical data
- communicate technical information
- conduct training for personnel
- confer with engineering, technical or manufacturing personnel
- consult with customers concerning needs
- create mathematical or statistical diagrams or charts
- direct and coordinate activities of workers or staff
- draw prototypes, plans, or maps to scale
- evaluate engineering data
- examine engineering documents for completeness or accuracy
- follow manufacturing methods or

instruments to specification
- communicate technical information
- confer with engineering, technical or manufacturing personnel
- develop plans for programs or projects
- draw prototypes, plans, or maps to scale
- estimate cost for engineering projects
- evaluate engineering data
- fabricate, assemble, or disassemble manufactured products by hand
- follow manufacturing methods or techniques
- follow statistical process control procedures
- inspect facilities or equipment for regulatory compliance
- install electronic equipment, components, or systems
- install, maintain, or repair electronics manufacturing equipment
- install/connect electrical equipment to power circuit
- manage contracts
- modify electrical or electronic equipment or products
- operate precision test equipment
- prepare technical reports or related documentation
- read blueprints
- read manufacturing outlines for electronic products
- read schematics
- read technical drawings
- repair computer controlled manufacturing systems
- repair electronic components, equipment, or systems
- resolve engineering or science problems
- solder electrical or electronic connections or components
- test equipment as part of engineering projects or processes
- troubleshoot electronics manufacturing equipment
- understand detailed electronic design specifications
- understand engineering data or reports
- understand service or repair manuals
- understand technical information for electronic repair work
- understand technical operating, service or repair manuals
- use drafting or mechanical drawing techniques
- use electrical or electronic test devices or equipment
- use knowledge of metric system
- use precision measuring tools or

techniques
- inspect manufactured products or materials
- prepare technical reports or related documentation
- read blueprints
- read schematics
- read technical drawings
- understand engineering data or reports
- understand technical operating, service or repair manuals
- use computer aided drafting or design software for design, drafting, modeling, or other engineering tasks
- use drafting or mechanical drawing techniques
- use government regulations
- use knowledge of metric system
- use precision measuring tools or equipment
- use spreadsheet software
- work as a team member

Technology - Examples
Computer aided design CAD software
• Autodesk AutoCAD software
• Autodesk Inventor
• Autodesk Mechanical
• Bentley Microstation
• Bentley Navigator
• Dassault Systemes CATIA software
• Piping and instrumentation design PID software
• PTC Pro/Cable
• PTC Pro/ENGINEER software
• PTC Pro/ENGINEER Wildfire
• PTC Pro/Mechanica
• PTC Pro/Pipe
• PTC Pro/Sheetmetal
• Reverse engineering software
• SofTech CADRA
• SolidWorks CAD software
Computer aided manufacturing CAM software
• Rapid prototyping software
Data base user interface and query software

- use precision measuring tools or equipment
- use robotics systems technology
- use scientific research methodology
- use technical information in manufacturing or industrial activities
- use technical regulations for engineering problems

Technology - Examples

Analytical or scientific software

- Mentor Graphics ModelSim
- Proportional integral derivative control PID software
- Root cause analysis software
- The Mathworks MATLAB

Computer aided design CAD software

- Autodesk AutoCAD software
- Cadence software
- Computer aided design CAD software
- MicroSim Pspice
- OrCAD Capture
- Prentice Hall Electronic Workbench MultiSim

Data base user interface and query software

- Database software
- Oracle software

Development environment software

- Assembler
- C
- Verilog

Document management software

- Adobe Systems Adobe Acrobat software

Graphics or photo imaging software

- Graphics software

Industrial control software

- Rockwell RS Logix
- Rockwell RSView

Internet browser software

- Microsoft Internet Explorer

Object or component oriented development software

- Microsoft Access

Document management software

- Document management software

Graphics or photo imaging software

- Adobe Systems Adobe After Effects
- Adobe Systems Adobe LiveMotion
- Graphic presentation software
- McNeel Rhino software
- Motion graphics software
- Non uniform rational b-splines NURBS software

Materials requirements planning logistics and supply chain software

- Bill of materials software

Optical character reader OCR or scanning software

- Scanning software
- Three-dimensional scanning software

Presentation software

- Microsoft PowerPoint

Spreadsheet software

- Microsoft Excel

Word processing software

- Microsoft Word

Tools - Examples

- Calculators
- Compasses
- Three-dimensional motion controllers
- Flexible curves
- Desktop computers
- Computer aided design CAD multi-unit display graphics cards
- Notebook computers
- Cutting plotters
- Print servers
- Protractors
- Architects' scales

- Computer aided software engineering CASE tools

Office suite software

- Microsoft Office

Operating system software

- Emulators

Spreadsheet software

- Microsoft Excel
- Spreadsheet software

Word processing software

- Microsoft Word

Tools - Examples

- Pliers
- Wrenches
- Dual power supplies
- Ammeters
- Wrist anti-static straps
- Microscopes
- Desktop computers
- Alternating current AC generators
- Digital cameras
- Direct current DC motors
- Dynamometers
- Frequency counters
- Nanosecond universal counters
- Current probes
- Harmonic analyzers
- Welding goggles
- Anti-static heel grounders
- Impedance meters
- Transformers
- Logic analyzers
- Spectrum analyzers
- Laser printers

- Backlit digitizers
- T-squares
- Graphics tablets
- Estimating keypads
- Triangles

- Lasers
- Bench lathes
- Magnetic pickup tools
- Programmable logic controllers PLC
- Microcomputers
- Computerized numerical control CNC machines
- Multimeters
- Notebook computers
- Ohmmeters
- Oscilloscopes
- Personal computers
- Phase shifters
- Phase shift indicators
- Digital plotters
- Dataloggers
- Direct current DC potentiometers
- Drills
- Power meters
- Power screwdrivers
- Q meters
- Screwdrivers
- Function generators
- Soldering equipment
- Desoldering stations
- Stroboscopes
- Wire wrap guns
- Cameras
- Wire strippers
- Tachometers
- Digital voltmeters DVM
- Wattmeters
- Welders

- Welding hoods
- Wire cutters
- Crimping pliers

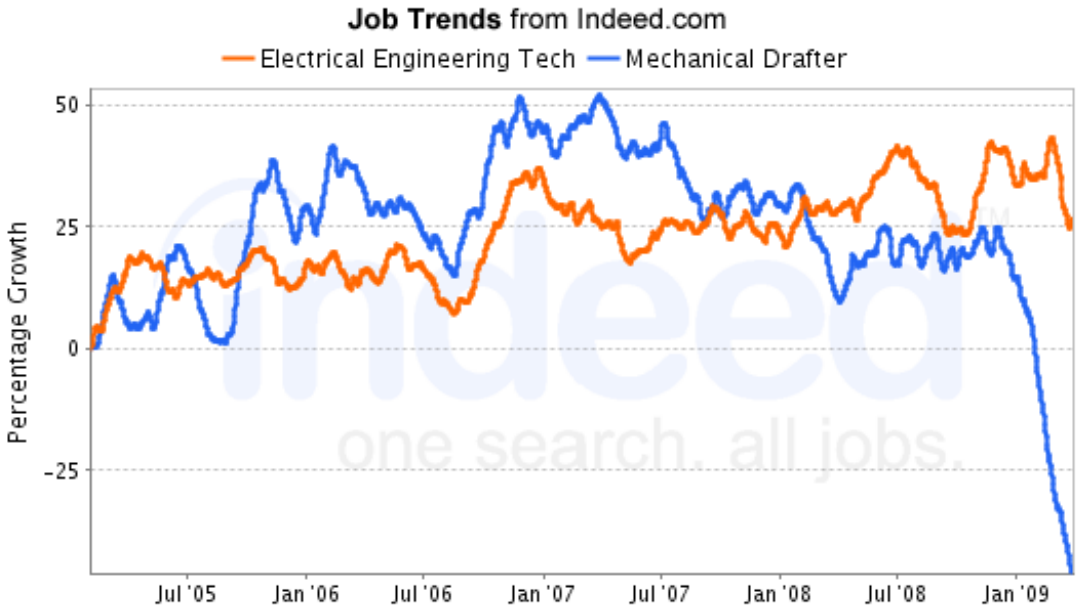
Labor Market Comparison

Description	Electrical Engineering Technicians	Mechanical Drafters	Difference
Median Wage	$ 45,180	$ 46,630	$ 1,450
10th Percentile Wage	$ 25,770	$ 38,290	$ 12,520
25th Percentile Wage	N/A	N/A	N/A
75th Percentile Wage	$ 61,600	$ 50,240	$(11,360)
90th Percentile Wage	$ 79,100	$ 52,420	$(26,680)
Mean Wage	$ 48,740	$ 46,320	$(2,420)
Total Employment - 2007	430	710	280
Employment Base - 2006	449	742	293
Projected Employment - 2016	361	754	393
Projected Job Growth - 2006-2016	-19.6 %	1.6 %	21.2 %
Projected Annual Openings - 2006-2016	9	22	13

National Job Posting Trends

Trend for Electrical Engineering Technicians

Trend for Mechanical Drafters



Data from Indeed

Recommended Programs

Mechanical Drafting and Mechanical Drafting CAD/CADD

Mechanical Drafting and Mechanical Drafting CAD/CADD. A program that prepares individuals to apply technical knowledge and skills to develop working drawings and electronic simulations in support of mechanical and industrial engineers, and related professionals. Includes instruction in manufacturing materials and processes, mechanical drafting, electrode-mechanical drafting, basic metallurgy, geometric dimensioning and tolerancing, blueprint reading and technical communication.

No schools available for the program

Maine Statewide Promotion Opportunities for Electrical Engineering Technicians

O*NET Code	Title	Grand TORQ	Job Zone	Employment	Median Wage	Difference	Growth	Annual Job Openings
17-3023.03	Electrical Engineering Technicians	100	3	430	$45,180.00	$0.00	-20%	9
17-3023.01	Electronics Engineering Technicians	89	3	430	$45,180.00	$0.00	-20%	9
17-3013.00	Mechanical Drafters	86	3	710	$46,630.00	$1,450.00	2%	22
17-2072.00	Electronics Engineers, Except Computer	84	4	210	$76,420.00	$31,240.00	-26%	4
27-1021.00	Commercial and Industrial Designers	84	4	140	$49,170.00	$3,990.00	5%	5
51-4111.00	Tool and Die Makers	83	3	160	$51,670.00	$6,490.00	-11%	2
15-1021.00	Computer Programmers	83	4	720	$58,240.00	$13,060.00	-12%	16
17-2071.00	Electrical Engineers	82	4	260	$73,050.00	$27,870.00	-10%	6
49-2094.00	Electrical and Electronics Repairers, Commercial and Industrial Equipment	82	3	440	$49,450.00	$4,270.00	-19%	15
49-2095.00	Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	82	5	20	$60,790.00	$15,610.00	5%	1
15-1051.00	Computer Systems Analysts	82	4	1,650	$69,340.00	$24,160.00	20%	78
15-1071.00	Network and Computer Systems Administrators	82	4	1,070	$57,690.00	$12,510.00	18%	44

15-1032.00	Computer Software Engineers, Systems Software	81	4	290	$73,410.00	$28,230.00	11%	8
15-1031.00	Computer Software Engineers, Applications	81	4	1,060	$63,750.00	$18,570.00	30%	47
17-2131.00	Materials Engineers	81	4	40	$70,250.00	$25,070.00	-7%	1

Top Industries for Mechanical Drafters

Industry	NAICS	% in Industry	Employment	Projected Employment	% Change
Architectural and structural metals manufacturing	332300	6.37%	4,993	5,394	8.04%
Self-employed workers, primary job	000601	4.81%	3,771	4,064	7.77%
Metalworking machinery manufacturing	333500	4.69%	3,674	3,043	-17.18%
Other general purpose machinery manufacturing	333900	4.37%	3,423	3,126	-8.68%
Employment services	561300	3.41%	2,669	3,075	15.23%
Agriculture, construction, and mining machinery manufacturing	333100	2.98%	2,333	2,204	-5.55%
Aerospace product and parts manufacturing	336400	2.73%	2,139	2,372	10.88%
Industrial machinery manufacturing	333200	2.48%	1,945	1,612	-17.13%
Other fabricated metal product manufacturing	332900	2.03%	1,593	1,427	-10.37%
Motor vehicle parts manufacturing	336300	1.85%	1,446	1,164	-19.46%
Navigational, measuring, electromedical, and control instruments manufacturing	334500	1.78%	1,397	1,353	-3.15%
Ventilation, heating, air-conditioning, and commercial refrigeration equipment manufacturing	333400	1.70%	1,328	1,236	-6.94%
Management of companies and enterprises	551100	1.39%	1,089	1,270	16.62%
Plumbing, heating, and air-conditioning contractors	238220	1.36%	1,064	1,215	14.23%
Commercial and service industry machinery manufacturing	333300	1.17%	918	814	-11.27%

Top Industries for Electrical Engineering Technicians

Industry	NAICS	% in Industry	Employment	Projected Employment	% Change
Semiconductor and other electronic component manufacturing	334400	11.11%	18,927	16,543	-12.59%
Navigational, measuring, electromedical, and control instruments manufacturing	334500	7.00%	11,938	11,429	-4.26%

Employment services	561300	6.59%	11,227	14,209	26.56%
Wired telecommunications carriers	517100	5.49%	9,362	7,350	-21.49%
Federal government, excluding postal service	919999	5.23%	8,920	8,432	-5.47%
Postal service	491100	4.31%	7,344	7,476	1.80%
Electric power generation, transmission and distribution	221100	4.15%	7,078	6,510	-8.03%
Communications equipment manufacturing	334200	3.23%	5,503	5,547	0.79%
Research and development in the physical, engineering, and life sciences	541710	3.07%	5,233	5,583	6.69%
Electrical and electronic goods merchant wholesalers	423600	2.83%	4,829	5,693	17.90%
Computer and peripheral equipment manufacturing	334100	2.62%	4,464	2,922	-34.54%
Local government, excluding education and hospitals	939300	2.21%	3,764	4,228	12.34%
Computer systems design and related services	541500	1.90%	3,241	4,376	35.02%
Professional and commercial equipment and supplies merchant wholesalers	423400	1.69%	2,888	3,367	16.57%
Aerospace product and parts manufacturing	336400	1.59%	2,708	2,758	1.84%

